

DOMINGUEZ CHANNEL BATHYMETRIC SURVEY AND SITE INVESTIGATION

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SURVEY MATERIALS & METHODS

Field efforts were initiated over three separate events, once from January, once in February, and a final survey in the final week of March of 2018. Field crews targeted periods of a less than 20 percent chance of rain and a high tide in the morning to provide the necessary water depths for surveying the upper portions of the channel. During a wet winter and spring, there were few opportunities to enter the DC for the extended survey period needed.

A small aluminum 12-foot Jon boat was hand carried and placed into the water at the Leward Bay Marina. The Jon boat was outfitted with a 2.5-hp 4 stroke outboard, an aluminum collapsible GPS antenna mount, and a bow-mounted transducer clamp. Collectively the Jon boat and small motor weigh less than 115 lbs.

The survey used a WASSP S3 multibeam echosounder coupled with a Hemisphere VS330 RTK GPS for spatial positioning. A Specialty Devices MRU was integrated to the survey package for motion reference. A network based RTK correction service, TopNet Live, was used for RTK positioning and vertical correction. Daily measurements of the temperature and salinity were made using a YSI 6920-V2 to correct for speed of sound changes. Figure 1 provides a schematic of how the survey boat was set-up.

The WASSP S3 system was mounted in a cooler which served as a protective encasement, but also helped field crews moderate WASSP hardware temperatures. Two deep cycle AMG batteries were used to power the survey system, which provided ample power for the day. Data was collected and processed using Beamworx and the native WASSP multibeam software, WASSP Navigator. Calibration transects were for pitch, heave, and roll compensation in the Consolidated slip area.



Figure 1. Jon Boat Configuration

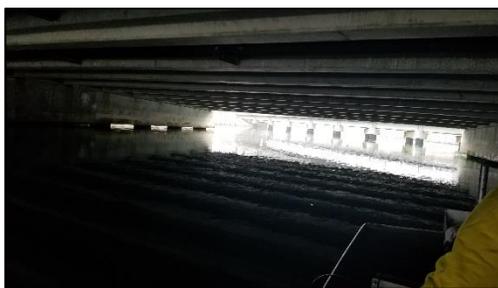


Figure 2. Transiting under the POLA Railroad Bridge

Two Pi scientists entered the southern end of the DC from the Consolidated Slip area of the Port of Los Angeles (Figure 2). Several booms were encountered within the Channel at different times during the surveys. The one fixed boom present during all surveys was the LA County trash boom, located in the lower portion of the DC Channel. Other known hazards included a variety of shopping carts, rock piles, and floating debris. In general, the survey vessel would have to stop every 10-15 minutes to clean debris out of the prop. Large amounts of debris were below the surface of the water, making recognition prior to entanglement difficult.

SURVEY RESULTS

Pi scientists were able to survey the entire length of the Dominguez Channel, from the West 182nd Street overpass to the Consolidated Slip area of the Port of Los Angeles, with only small area(s) of the channel near the Alameda overpass, not having bathymetric data. For survey purposes, the Channel was broken into three parts, which were surveyed during consecutive survey days. For a variety of reasons that included trash accumulation, movie shoots, rain events, and chemical spills, three attempts were made to complete the survey, however, only the data collected from the last event, 30 March 2018 survey period, was used.

Survey Limitations

In general, the extent of the survey was limited by water depth in the northern part of the Dominguez Channel, and the presence of debris or rocks near the channel edges. Several shopping carts were observed near the edges of the Channel, or just beyond, which limited how close to the channel edges the survey boat could safely survey (Figure 3). There were large obstructions in the channel that were observed during the site visit in August of 2017, and subsequently confirmed during the bathymetric surveys.



Figure 3. Shopping Cart in the Dominguez Channel

An additional limitation of the survey was the ability to maintain a fixed RTK correction with the network correction. The number of overpasses and objects available to interfere (i.e., industrial buildings and large metal structures) were numerous in parts of the channel, specifically the S-bend area near the Alameda St. overpass, and near the upper portion of the channel (182nd street overpass). When RTK data was not available, data was processed, and water level corrected based on the published tides for the time of survey.

1.0 Upper Dominguez Channel (from W 182nd Street overpass to 405 overpass):

This portion of the Upper DC transitions from a shallow mud lined bank in the northern part of the Channel, near the 182nd street overpass, to a deeper concrete lined channel to the north of the I-405. Initial site visits had suggested there were obstructions in the channel (Figure 4), and subsequent bathymetric data collection confirmed the presence of a rockpile near the Del Amo overpass. Figure 5 highlights the rock pile and an area of scour just to the south.



Figure 4. Side Scan Sonar Image of Channel Obstruction Detected During Site Visit

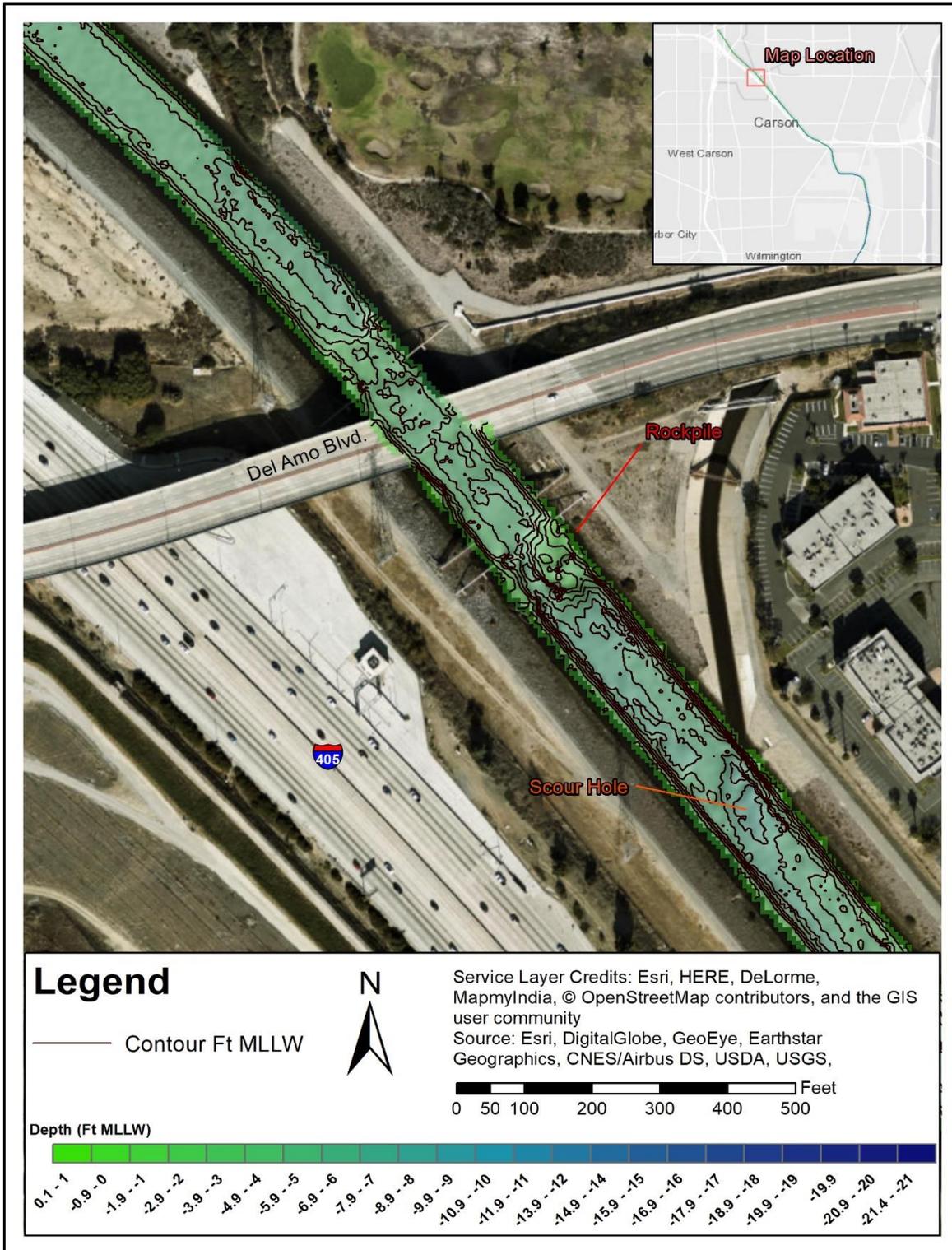


Figure 5. Bathymetric Survey of Del Amo Rock Pile

2.0 Transition Area (from the I-405 overpass to the Alameda Street Overpass):

Side scan sonar imagery collected during the site visit in August suggested that there was some type of bottom disturbance and residual material near the I-405 overpass (Figure 6). This bottom deformation was not present in the 2006 data. Further investigation using Google Earth and historical imagery for the area of the channel indicate that at there was a construction project, likely when the I-405 was updated, that had built a temporary dirt bridge for transporting equipment and/or work crews across the channel (Figure 7). The former construction area is the shallowest portion of the channel in this area, and needed a high tide to survey. Figure 8 provides the bathymetric survey results for the area around the I-405 overpass.



Figure 6. Site Visit Side Scan Sonar Imagery of Construction Residuals in the Channel



Figure 7. Google Earth Image Showing Temporary Bridge Across Channel

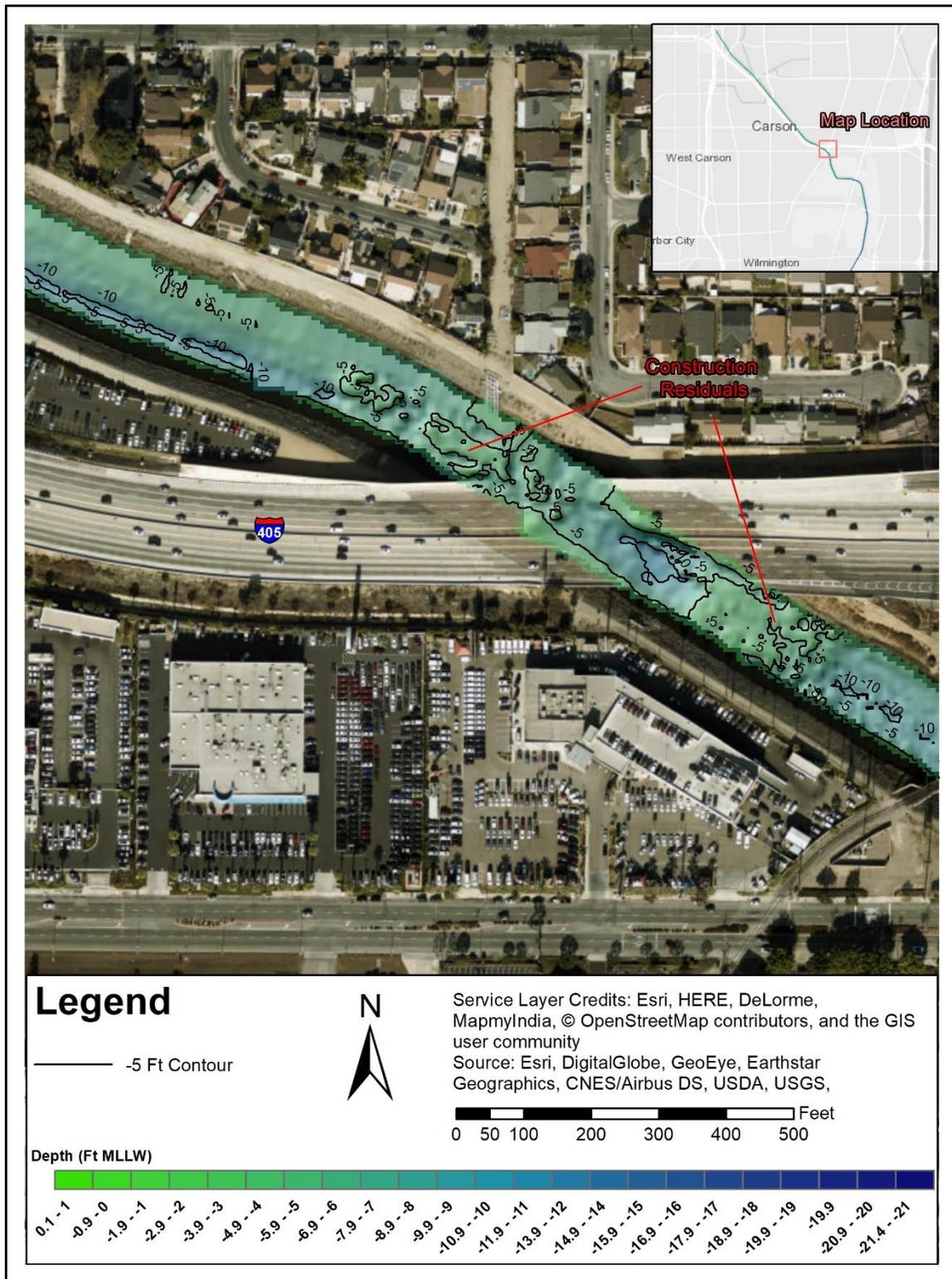


Figure 8. I-405 Overpass Bottom Obstructions Map

This section of the channel was the most difficult to sample. The lack of RTK connectivity and amounts of trash in the channel made entanglement common and precluded consistent straight line transects. This the southern section of the S-Turn area was not able to be sampled due to a chemical spill during the final days of survey (Figure 9). Several booms were in place, which were not present the day before. The S-turn area showed a distinct accumulation of sediment on the inside portions of the bend, and an area of scour in the outer part of the channel bend.



Figure 9. Chemical Spill Containment in the Channel

3.0 Lower Dominguez Channel (Alameda Street overpass to Consolidated Slip):



Figure 10. Trash Containment Booms in Lower Dominguez Channel

The lower Dominguez Channel was largely clear of underwater obstructions. Large amounts of trash and trash containment booms south of Wilmington to the Alameda Street overpass made this area difficult to survey (Figure 10). There was a total of 4 booms located between the East Anaheim Street and Pacific Coast Highway (PCH) Bridges. Water depths were significantly deeper in this section of the Channel, generally ranging from -13 to -17 feet, and as deep as -20 feet in some locations.

The terminus of the Dominguez Channel is lined with large concrete armor stones, with little vegetation, and several homeless encampments adjacent to the channel. While Pi field crews were surveying, a local fisherman caught a Barred Sand Bass (*Paralabrax nebulifer*) on the southern side of the PCH bridge which suggest a significant marine influence (Figure 11). The current around the pilings leading to consolidated slip were very turbulent at the tide changes.



Figure 11. Fisherman in Lower Dominguez Channel



SUMMARY

If future bathymetric surveys in the Dominguez Channel are undertaken, survey crews should be prepared to encounter the same type of debris, access limitations, weather windows, and tides that make the channel so difficult to survey. Due to the amount of difficult encountered in the winter due to the potential for rainfall, it is strongly advised the surveys be conducted in the summer period, when the threat of rainfall is minimal, and conditions are relatively static. The current survey used a multibeam, however, due to the shallow depth in some areas of the channel, a mixed approach may be more logistically feasible, and remove some difficulty that multibeam systems encounter in shallow water conditions.